REMARKS

This Amendment is submitted in response to the Final Office Action mailed October 21, 2003. Applicant files herewith a RCE, a Petition for a three-month extension of time, and fees therefore. The present Amendment is intended as a submission required under 37 C.F.R. § 1.114 and is submitted concurrently with the RCE.

The Final Office Action have been carefully considered. The present Amendment is intended to be a complete reply thereto and to place the case in condition for allowance.

Claims 3-4 and 6 are pending. Claims 1-2 and 5 have been cancelled without prejudice to the subject matter therein. Claim 6 have been added. Support for claim is found, *inter alia*, in the specification as originally filed on page 11, line 36 to page 12, line 1.

THE CLAIMS ARE NOT OBVIOUS

Claims 3-4 stand rejected under 35 U.S.C. § 103(a) as being obvious over JP 6-716 to Katsumi in view of JP 6-717 to Katsumi. Applicant respectfully traverses the rejection. JP 6-716 and JP 6-717 are referred to by the Examiner as JP '997 and JP '998, respectively, presumably because their application numbers are JP 04158997 and JP 04158998. Applicant will henceforth refer to the cited references by their application numbers rather than by publication nos. to be consistent with the Examiner's terminology.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to

combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP 2143.

The references, taken alone or in combination, do not teach every element of the invention. In particular, the references fail to teach the claimed relationship between the thickness D of the body and the coefficient α. According to the present invention,

when $0.85 \text{ mm} \leq D \leq 0.95 \text{ mm}$, $0.15 \text{ mm} \leq \alpha \leq 0.35 \text{ mm}$ is established;

when $0.96 \text{ mm} < D \leq 1.2 \text{ mm}$, $0.2 \text{ mm} \leq \alpha \leq 0.4 \text{ mm}$ is established;

when $1.2 \text{ mm} < D \leq 1.5 \text{ mm}$, $0.25 \text{ mm} \leq \alpha \leq 0.43 \text{ mm}$ is established;

when $1.5 \text{ mm} < D \leq 1.7 \text{ mm}$, $0.3 \text{ mm} \leq \alpha \leq 0.5 \text{ mm}$ is established; or

when $1.7 \text{ mm} < D$, $0.35 \text{ mm} \leq \alpha \leq 0.6 \text{ mm}$ is established.

This relationship is not taught or suggested by JP '997 and JP '998.

Further, the references, taken alone or in combination, fail to disclose the limitation $R/1.5 < A \leq 2R$. The Examiner is of the opinion that this range is obvious because it involves routine optimization. Applicant respectfully submits that the optimization is anything but routine. In support thereof, Applicant files herewith an Affidavit (in Japanese with English translation) showing that the optimization process is not routine and is not apparent to one of ordinary skill in the art.

Notwithstanding the Affidavit, however, both cited references teach away from the relationship of $R/1.5 < A \leq 2R$, because both references teach $A \leq R/1.5$. For example, in Figure 3, JP '997 discloses $R=1.5$ and $A= 0.2$, which is clearly outside of the range of the claimed

invention. Similarly, JP '998 discloses R=1.5 and A=0.3 and 1, which is also outside the range of the claimed invention. According to the present invention, for R=1.5, A should be greater than 1 and less than or equal to 3. This is clearly not taught by the cited references which discloses A values less than or equal to 1, when R is 1.5. Thus, one of ordinary skill in the art, having knowledge of JP '997 and JP '998, would not have any motivation to modify the citer references to arrive at the relationship $R/1.5 < A \leq 2R$, because the cited references taught otherwise.

Moreover, with respect to dependent claim 6, the cited references fail to disclose a saw blade having a sine curve shape.

Therefore, for the reasons noted, the claims are not obvious within the meaning of 35 U.S.C. § 103. Accordingly, the rejections are improper and should be withdrawn.

CONCLUSION

Applicant has responded to the Final Office Action mailed October 21, 2003. All pending claims are now believed to be allowable and favorable action is respectfully requested.

In the event that there are any questions relating to this Amendment or to the application in general, it would be appreciated if the examiner would telephone the undersigned attorney concerning such questions so that the prosecution of this application may be expedited.

Please charge any shortage or credit any overpayment of fees to BLANK ROME LLP, Deposit Account No. 23-2185 (000004-00659). In the event that a petition for an extension of time is required to be submitted herewith and in the event that a separate petition does not

accompany this response, applicant hereby petitions under 37 C.F.R. 1.136(a) for an extension of time for as many months as are required to render this submission timely.

Any fees due are authorized above.

Respectfully submitted,

KATSUMI NAKAHARA

By: Michael D. White

Michael D. White
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Attachment: Affidavit in Japanese with English translation

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JAM－US－00002米国の局指令に対する宣誓供述書

米国出願09/597159に対する2003年10月21日送達のオフィシャル・アクションに対し、出願人は以下のように宣誓供述する

請求項3に記載の「Aの寸法はRの3分の2より大きく、Rの2倍より小さい」という数値限定に対する難易度について下記します。

上記数値限定は切屑を効率よく小さくカールさせる目的であるが、金属を鋸刃で切削する場合に生じる切屑の挙動については、ワークの材質、機械的性質や切削速度、切り込み量、冷却材など多くの要因があり、理論計算での最適設計は事実上できないのが現状です。

従って、切屑を小さくカールさせるために必要な歯部の最適形状を求めるには試行錯誤を行い、多くの切削実験を実施しなければなりません。

このように、多くの実験を実施し、その結果から実施効果を慎重に吟味し、最終的に導き出したのが上記数値限定の範囲であり、単純な設計変更には値しないと認識します。

21. FEB. 2004
AMADA CO., LTD
SUSUMU TSUJIMOTO

S. Tsujimoto

(Translation into English)

Affidavit for the Office Action of JAM-US-0002 in the United States

For the Office Action of October 21, 2003 (DATE MAILED) to the United States Application No. 09/597159, the Applicant swears an affidavit as follows:

I will explain degree of difficulty for the figure restriction of "$R/1.5 < A \leqq 2R$" defined in the claim 3, hereinbelow;

An object of the figure of "$R/1.5 < A \leqq 2R$" is that chips generated at cutting operation would be effectively curled into small-diameter. Actions of the metal chips generated by saw blade at the cutting operation are according to characteristic of material to be cut, mechanical characteristic, velocity of cutting operation, cutting amount into material to be cut, and to coolant. Therefore, most appropriate design by theory calculation is actually impossible in those days.

In this connection, to seek the most appropriate design of the shape of tooth of saw blade which enables to generate small-diameter curled chips, many experiments in cutting operation with experimental failures are actually required.

As explained above, the many experiments in cutting operation are achieved. After results and conditions of the experiments are carefully selected from the many experiments, a range of the figure of "$R/1.5 < A \leqq 2R$" defined in the claim 3 is finally researched out from the results and conditions of the experiments. Therefore, I think that the figure of "$R/1.5 < A \leqq 2R$" would not be a simple designing change.

21. FEB. 2004
AMADA CO., LTD
SUSUMU TSUJIMOTO
(Signature)

I, Yoshio DOBASHI of MIYOSHI & MIYOSHI, Toranomon Daiichi Building, 2-3, Toranomon 1-chome, Minato-ku, Tokyo, Japan,

do hereby declare that I have a thorough knowledge of the Japanese and English languages and that the writing contained in the following page is a correct translation of the attached Affidavit by Mr. Susumu TSUJIMOTO dated of February 21, 2004.

Declared in Japan
This 19th day of April, 2004

Y. Dobashi
Yoshio DOBASHI